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| 09/836,284      | 04/18/2001  | Kazunaga Suzuki      | Q64167              | 5459             |

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EXAMINER

TRAN, LY T

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/836,284

Applicant(s)

SUZUKI, KAZUNAGA

Examiner

Ly T TRAN

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-5, 12, 17 and 22-24 is/are allowed.
- 6) ☒ Claim(s) 1, 6-11 and 13-16 is/are rejected.
- 7) ☒ Claim(s) 18-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Ebisawa (USPN 5,428,380).

With respect to claim 1, Kashio discloses an ink jet recording apparatus comprising a recording head including a nozzle orifice communicated with a pressure generating chamber, a pressure generator, which varies pressure of ink the pressure generating chamber (Fig.2) and a controller, which drives the pressure generator to eject ink droplets from the nozzle orifice such that a plurality of sub-flushing operations are intermittently repeated in one flushing operation with a first time interval when a recording operation of the recording head is not performed, each sub-flushing operation including a plurality of ink ejections repeated for a predetermined times with a second time interval which is shorter than the first time interval or in another word, the flushing period is longer than the ink ejecting period (Column 3: line 9-21, Column 5: line 4-16, each time of counting cycle is 15-30 minutes, so the time of one sub-flushing operation has to be shorter than the time of all sub-flushing operation discharge the ink).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ebisawa (USPN 5,428,380) in view of Kashio (USPN 3,925,788)

Ebisawa discloses an ink jet recording apparatus comprising a recording head including a nozzle orifice communicated with a pressure generating chamber, a pressure generator, which varies pressure of ink the pressure generating chamber (Fig.2) the recording head performs the recording operation while moving a main scanning direction (Fig.1) and the flushing operations are performed when the recording head is in a stand-by-state which is defined as a time period from when the recording head stops moving when the recording head stops moving to when the recording head is stars moving (Column 4: line 31-32).

However, Ebisawa fails to teach a controller, which drives the pressure generator to eject ink droplets from the nozzle orifice such that a plurality of sub-flushing operations are intermittently repeated in one flushing operation with a first time interval when a recording operation of the recording head is not performed, each sub-flushing operation including a plurality of ink ejections repeated for a predetermined times with a second time interval which is shorter than the first time interval or in another word, the flushing period is longer than the ink ejecting period.

Kashio teaches a controller, which drives the pressure generator to eject ink droplets from the nozzle orifice such that a plurality of sub-flushing operations are intermittently repeated in one flushing operation with a first time interval when a recording operation of the recording head is not performed, each sub-flushing operation including a plurality of ink ejections repeated for a predetermined times with a second time interval which is shorter than the first time interval or in another word, the flushing period is longer than the ink ejecting period (Column 3: line 9-21, Column 5: line 4-16, each time of counting cycle is 15-30 minutes, so the time of one sub-flushing operation has to be shorter than the time of all sub-flushing operation discharge the ink).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching of Ebisawa to have a controller, which drives the pressure generator to eject ink droplets from the nozzle orifice such that a plurality of sub-flushing operations are intermittently repeated in one flushing operation with a first time interval when a recording operation of the recording head is not performed, each sub-flushing operation including a plurality of ink ejections repeated for a predetermined times with a second time interval which is shorter than the first time interval as taught by Kashio for the purpose of preventing the obstruction of normal ejection of ink due to good freely flowing ink being always supplied to the nozzle opening.

3. Claims 6, 7 and 14, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio (USPN 3,925,788) in view of Kitahara (USPN 6,357,846)

Kashio fails to teach the controller driver the pressure generator to vibrate a meniscus of ink in the nozzle orifice between the respective flushing operations, the meniscus of ink is vibrated such an extent that an ink droplet is not ejected from the nozzle orifice, pressure generator is a piezoelectric and a vibrating number of pressure generator is determined in accordance with the type of ejected ink.

Kitahara teaches the controller driver the pressure generator to vibrate a meniscus of ink in the nozzle orifice between the respective flushing operations, the meniscus of ink is vibrated such an extent that an ink droplet is not ejected from the nozzle orifice (Column 3: line 27-32), and Kitahara also teaches the pressure generating element can be a piezoelectric element or a heating element (Column 3: line 1-6) and a vibrating number of pressure generator is determined in accordance with the type of ejected ink (Column 6: line 14-33)

It would have been obvious to one having ordinary skill in the art at the time the invention was made with vibrate a meniscus of ink in the nozzle orifice between the respective flushing operations, the meniscus of ink is vibrated such an extent that an ink droplet is not ejected from the nozzle orifice as taught by Kitahara for the purpose of necessary fine vibration is applied to the meniscus of ink in each nozzle when the fine vibration is needed, in according with the operation conditions of each nozzle.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio (USPN 3,925,788) in view of Kobayashi et al. (USPN 6,036,299).

Kashio fails to teach the controller drives the pressure generator to vibrate a meniscus of ink in the nozzle orifice before an initial flushing operation of performed.

Kobayashi et al teaches the controller drives the pressure generator to vibrate a meniscus of ink in the nozzle orifice before an initial flushing operation of performed (Fig.2: element 24, Column 4: line 10-12).

It would have been obvious to one having ordinary skill in the art at the time the invention was made with the controller drives the pressure generator to vibrate a meniscus of ink in the nozzle orifice before an initial flushing operation of performed as taught by Kobayashi et al. for the purpose of causing the air bubble to be reduced to very small bubble or disappear (Kobayashi USPN 6,036,299, Column 11: line 19-21)

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio (USPN 3,925,788) in view of Takahashi et al. (USPN 5,475,404).

Kashio fails to teach a timer which measures a time period of the stand-by state, wherein repeated number of ink ejections in the respective flushing operation is determined in accordance with the measured stand-by state.

Takahashi teaches a timer which measures a time period of the stand-by state, wherein repeated number of ink ejections in the respective flushing operation is determined in accordance with the measured stand-by state (Fig.6: element 502-510, Column 8: line 55-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made with a timer which measures a time period of the stand-by state,

wherein repeated number of ink ejections in the respective flushing operation is determined in accordance with the measured stand-by state as taught by Takahashi et al. for the purpose of optimizing a recover operation (Takahashi USPN 5,475,404, Column 4: line 41-42).

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio (USPN 3,925,788) in view of Kitahara (USPN 6,357,846).

Kashio fails to teach a vibrating number of pressure generator is determined in accordance with the type of ejected ink.

Kitahara teaches a vibrating number of pressure generator is determined in accordance with the type of ejected ink (Column 6: line 14-33)

It would have been obvious to one having ordinary skill in the art at the time the invention was made with a vibrating number of pressure generator is determined in accordance with the type of ejected ink as taught by Kitahara for the purpose of preventing the viscosity increase and stabilizing the flying path of the ink drop.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio (USPN 3,925,788) in view of Kobayashi et al. (USPN 6,036,299) as applied to claim 1 and 9 above, further in view of Kitahara (USPN 6,357,846).

The combination of Kashio and Kobayashi et al fails to teach a vibrating number of pressure generator is determined in accordance with the type of ejected ink.



Kitahara teaches a vibrating number of pressure generator is determined in accordance with the type of ejected ink (Column 6: line 14-33)

It would have been obvious to one having ordinary skill in the art at the time combined invention of Ebisawa and Kobayashi was made with a vibrating number of pressure generator is determined in accordance with the type of ejected ink as taught by Kitahara for the purpose of preventing the viscosity increase and stabilizing the flying path of the ink drop.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio (USPN 3,925,788) in view of Kitahara (USPN 6,357,846).

The combination of Kashio and Kitahara discloses the claimed invention except for the pressure generator is driven at the maximum driving frequency to vibrate the meniscus of ink. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vibrate the ink at the maximum driving frequency, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

***Allowable Subject Matter***

9. Claims 2-5, 12, 22-24 are allowed.

The primary reason for the allowance of claims 2 and 3 is the inclusion of the limitation of an ink jet print head comprising an ejection frequency in a final flushing operation is higher than an ejection frequency in an initial flushing operation. It is

limitation found in each claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 4 and 5 is the inclusion of the limitation of an ink jet print head comprising the repeated number of ink ejection in a final flushing operation is greater than the repeated number of ink ejection in an initial flushing operation. It is limitation found in each claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 12 is the inclusion of the limitation of an ink jet print head comprising a vibrating number is determined in accordance with the measured length of the stand-by time period. It is limitation found in each claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 17 is the inclusion of the limitation of an ink jet print head comprising the combination of a drive signal generator, which generated a common drive signal including a flushing waveform configured to perform an ink ejection and a meniscus vibrating waveform configured to vibrate a meniscus of ink in the nozzle orifice. It is limitation found in each claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

10. Claims 18-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 18 and 19 appear to be allowable over the prior art of record because at least prior art record have not been found or teach an ejection frequency in a final sub-flushing operation is higher than an ejection frequency in an initial sub-flushing operation.

Claims 20 and 21 appear to be allowable over the prior art of record because at least prior art record have not been found or teach the repeated number of ink ejection in a final sub-flushing operation is greater than the repeated number of ink ejection in an initial sub-flushing operation.

### ***Response to Arguments***

11. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's argument that Ebisawa does not teach plurality of sub-flushing operations are intermittently repeated in one flushing operation is persuasive but is moot in view of Kashio.

### ***Conclusion***

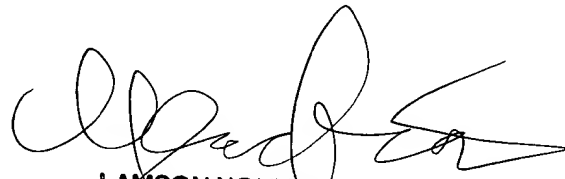
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ly T TRAN whose telephone number is 703-308-0752. The examiner can normally be reached on M-F (7:30am-5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 703-308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0967.



March 27, 2003



LAMSON NGUYEN  
PRIMARY EXAMINER  
07/07/03